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खाँचदार नली तंत्र — विशिष्टि

Indian Standard

GROOVED PIPE COUPLINGS — SPECIFICATION

UDC 621·643·415

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 1991 **Price Group 3**

Steel Tubes, Pipes and Fittings Sectional Committee, MTD 19

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalised by the Steel Tubes, Pipes and Fittings Sectional Committee had been approved by the Metallurgical Engineering Division Council.

Grooved pipe couplings are widely in used in industrial piping in India. They are available through indigenous manufacture. They are also viable and more convenient to use for water pipelines especially in bigger sizes as compared to flanged or screwed joints. Hence it was felt necessary to formulate a standard specification for grooved coupling systems.

The coupling is used in various piping applications such as fire protection, petrochemicals, compressed air, factory utilities, mining, plant processing lines, fluidised bulk conveying systems, paper mills, shipbuilding, military camps, concrete conveying, marine pumping and water supply.

Indian Standard

GROOVED PIPE COUPLINGS—SPECIFICATION

1 SCOPE

This standard covers the requirement for grooved pipe couplings for steel pipes including carbon alloy and stainless steel pipes.

2 REFERENCES

The following standards have been referred to in this Indian Standard:

IS No.	*Title*
1367 : 1967	Technical supply conditions for threaded steel fasteners (Issued in Parts)
1865 : 1991	Iron castings with spheroidal or nodular graphite (*third revision*)
2108 : 1977	Blackheart malleable iron castings (*first revision*)
3444 : 1987	Corrosion resistant alloy steel and nickel based castings for general applications (*first revision*)
3447 : 1965	Shellac jointing or gaskets compound

3 TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 Black Tube

Tube as manufactured, but without any subsequent surface treatment.

3.2 Exact Length of Screwed and Socketed Tube

The length of the tube exclusive of the socket.

NOTES

1 While 3.2 applies to exact lengths, 3.4 applies to random lengths only.

2 The length of the tube inclusive of the socket means the tube length measured with socket fitted at one end to handling-tight.

3 Handling-tight means that the socket is so tight fitted that it should not fall down during handling or transit.

3.3 Nominal Bore

A size reference denoting the approximate bore of the tube. For each size of tube, the outside diameter is fixed by the corresponding screw thread dimensions of IS 554 : 1975 'Dimensions for pipe threads where pressure-tight joints are required on the threads (*second revision*)' and therefore, the actual bore of each size of tube will vary according to the thickness.

3.4 Random Length

Normal manufacturing lengths which may vary over a range of several metres. Alternatively, a length range agreed to between the purchaser and the manufacturer.

3.5 Socket

The screwed coupling utilized in jointing the tubes together.

NOTE — The term 'socket' is synonymous with the term 'coupler'.

3.6 Tube (Pipe)

A long hollow, open-ended object of circular or other-section. The term 'tube' is synonymous with the term 'pipe'.

3.7 Effective Length

The term 'effective length' denotes the actual length that a pipe contributes when assembled in a run of piping.

3.8 Exact Length

The term 'exact length' denotes pipes cut to specific length on which only a small tolerance is allowed.

3.9 Nominal Size

The term 'nominal size' denotes the approximate inside or outside diameter of pipe depending on the size.

3.10 Butt Welded Pipe (Grade YSt 170 Only)

Butt welded pipe (including continuous weld process) is defined as manufacturing a pipe having one longitudinal seam formed by mechanical pressure to make the welded junction, the strip being furnace heated to the welding temperature prior to welding.

3.11 Seamless

Seamless pipe is defined as wrought steel tubular product without a welded seam manufactured by hot working of steel or if necessary, by subsequently cold finishing the hot-worked tubular product to produce the desired shape, dimensions and properties.

3.12 Electric Welded Pipe

A pipe having one longitudinal seam formed by electric resistance welding or electric induction welding without the addition of extraneous metal. The weld seam of electric-resistance and induction welded pipe shall be heat treated after welding to a minimum temperature of 538°C or processed in such a manner that no untempered martensite remains.

3.13 Roll Groove Method

Pipes, elbows, tees and crosses rolled at both ends for accommodating the grooved couplings.

3.14 Cut Groove Method

Pipes, elbows, tees and crosses cut at both ends for accomodating the grooved couplings.

3.15 Grooved Couplings

Couplings used for joining pipe to pipe and pipe to pipe fittings.

4 DESIGNATION

Grooved couplings covered by this standard shall be designated by the nominal bore of the pipes to be joined, and shall be further classified as 'roll' and 'cut' depending on the wall thicknesses of the pipe. The maximum working pressure is 70 kg/cm^2. The maximum permissible temperature for different gasket grades are specified.

5 SUPPLY OF MATERIAL

The coupling shall consist of the following.

5.1 Housing

In two or more parts cast from Malleable/Ductile/Stainless steel material.

5.2 Gasket

The resilient elastomeric ring which is sandwiched between the housing and the pipes so to seal the joint while housing segments are tightened.

5.3 Fasteners

Heat treated, plated bolts and nuts with a minimum tensile strength of 80 kg/mm^2 conforming to IS 1367 : 1967.

5.4 Lubricant

Lubrication of gaskets and/or housing interiors and pipe ends to prevent gasket pinching and proper coupling assembly. Lubricant to be vegetable based.

6 MANUFACTURE

6.1 Housing

It shall conform to IS 2108 : 1977, IS 1865 : 1991 or IS 3444 : 1987 as agreed to between the purchaser and the manufacturer.

6.2 Gaskets

Shall be manufactured depending on the service conditions from one of the following grades as agreed to between the purchaser and the manufacturer:

GRADE 'H' : Chlorinated Butyl — Temperature range 30°C to 90°C recommended for water service within the specified temperature range plus a variety of dilute acids, air without hydrocarbon, food and many chemical services. It is NOT RECOMMENDED FOR HYDROCARBON.

GRADE 'E' : EPDM (Ethylene Propellene Diene Monomer) — Tempera ture range 35°C to 110°C. Recommended to hot water service within the specified range plus a variety of dilute acids, air without hydrocarbons, and many chemical services. Applicable for most grade H service recommendations. It is NOT RECOMMENDED FOR HYDROCARBON SERVICES.

GRADE 'T' : Buna-N (nitrile) — Temperature range 30°C to 65°C. Recommended to petroleum products, hydrocarbons, air with hydrocarbons, vegetable and mineral oils and water within the specified temperature range.

7 CHEMICAL COMPOSITION

The chemical analysis of the castings for housings shall conform to the applicable Indian Standard (*see* **6.1**) and that of gaskets to IS 3447 : 1965.

8 HYDRO TESTING

Each coupling shall be tested on the test bench hydraulically at one and a half times the working pressure and witnessed for 30 seconds for any leakages.

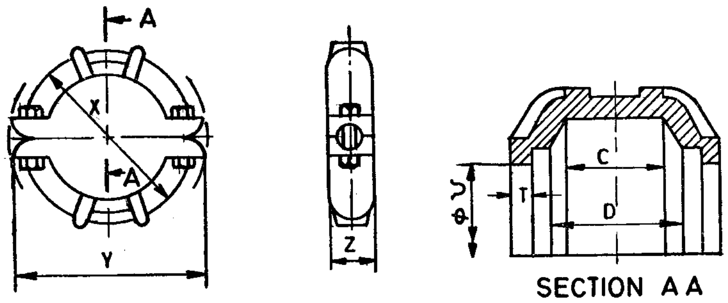
9 DIMENSIONS

9.1 The dimensions and tolerances of couplings, grooves on pipes and gaskets shall conform to Tables 1, 2 and 3.

9.2 Thickness of the pipe after grooving shall not be less than 60 percent of the specified thickness.

Table 1 Coupling Dimensions and Tolerances

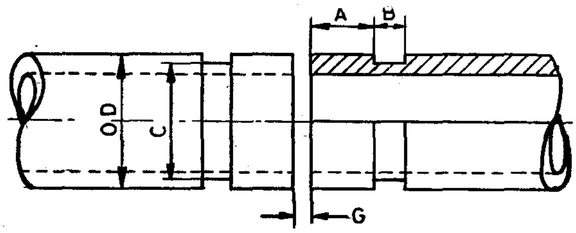
(*Clause* 9.1)



Nominal Size	Coupling Dimensions				Coupling Cavity Dimensions in mm					Bolt Dimensions		Max Joint Working PR	Max Deflection from Centre Line	
Coupling Size mm	O.D. of Pipe in mm	*X* Height in mm +1·0 −0·0	*Y* Width in mm +1·0 −0·0	*Z* Depth in mm +1·0 −0·0	φ Ω		*T* in mm +0·25 −0·00	*C* in mm ±0·1	*D* in mm ±0·1	No. of Bolts	Size × Length in mm	in kg/cm²	in Degrees	Deflection in Height for 6 mtrs in mm
					Bore Dia	Tol								
20	26·9	54	92	44	24·32	+0·4 −0·0	4·00	21·0	27·0	2	M 10×50	70	6°-47′	725
25	33·7	60	98·5	44	30·70	,,	4·00	21·0	27·0	,,	M 10×50	,,	5°-26′	525
32	42·4	67	118·0	44	39·5	,,	4·00	21·0	27·0	,,	M 12×65	,,	4°-19′	460
40	48·3	76	127·0	44	45·6	,,	4·00	21·0	27·0	,,	M 12×65	,,	3°-40′	400
50	60·3	92	134	44	57·7	,,	4·25	23·0	27·0	,,	M 12×65	,,	3°-1′	320
65	76·1	102	149	44	72·1	,,	4·25	23·0	27·0	,,	M 12×70	,,	2°-21′	265
80	88·9	115	168	44	85·4	,,	4·25	23·0	27·0	,,	M 12×70	,,	2°-3′	218
100	114·3	152	202	51	110·6	,,	5·00	25·0	30·0	,,	M 16×85	,,	3°-11′	338
125	139·7	174	254	51	135·9	,,	5·00	25·0	31·0	,,	M 20×110	,,	2°-35′	275
150	165·1	181	280	51	161·5	,,	6·25	25·0	31·0	,,	M 20×110	,,	2°-12′	233
150	168·28	181	280	51	164·5	,,	6·25	25·0	31·0	,,	M 20×110	70	2°-10′	230
200	219·1	265	356	60	215·4	,,	8·00	30·0	37·0	,,	M 22×130	48	1°-40′	178
250	273·05	343	425	63·5	269·3	,,	9·50	31·0	39·0	,,	M 24×150	48	1°-20′	142
300	323·85	394	483	63·5	319·3	,,	9·50	31·0	39·0	,,	M 24×165	40	1°-7′	119

Table 2 Pipe Grooves

(*Clause* 9.1)

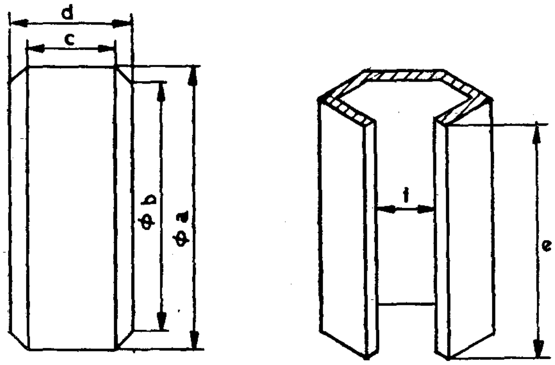


Pipe		Gasket Seat	Gap	Groove Width	Groove Base		Max Angle Between Joined Pipes	
Nominal Size mm	Actual O. D. mm	'*A*' ± 0·8 mm	'*G*' mm	'*B*' ± 0·8 mm	Outside Dia '*C*' mm	Tolerance mm	MM/Six mtr	Degree
20	26·9	16	0-3·15	8	23·82	+0·0 −0·4	725	6°-47′
25	33·7	16	0-3·15	8	30·2	,,	525	5°-26′
32	42·4	16	0-3·15	8	39·0	,,	460	4°-19′
40	48·3	16	0-3·15	8	45·1	,,	400	3°-46′
50	60·3	16	0-3·15	8	57·2	+0·0 −0·5	320	3°-1′
65	76·1	16	0-3·15	8	72·2	,,	265	2°-21′
80	88·9	16	0-3·15	8	84·9	,,	218	2°-3′
100	114·3	16	0-6·25	9·5	110·1	,,	338	3°-11′
125	139·7	16	0-6·25	9·5	135·4	,,	275	2°-35′
150	168·3	16	0-6·25	9·5	164·0	+0·0 −0·6	230	2°-10′
150	165·1	16	0-6·25	9·5	160·9	,,	233	2°-12′
200	219·1	19	0-6·25	11·0	214·4	,,	178	1°-40′
250	273·05	19	0-6·25	12·5	268·3	+0·0 −0·7	142	1°-20′
300	323·85	19	0-6·25	12·5	318·3	+0·0 −0·8	119	1°-7′

Table 3 Gasket Dimensions

(*Clause* 9.1)

All dimensions in millimetres.



Nominal Size	*a*	*b*	*d*	*c*	*e*	*f*
20	33	26	27	21	21	9
25	42	33	27	21	27	9
32	52	41	27	21	34	9
40	61	46	27	21	40	9
50	75	59	27	23	52	9
65	86	71	27	23	67	9
80	102	88	27	23	81	9
100	130	113	30	25	106	12
125	160	139	31	25	133	12
150(a)	186	157	31	25	160	12
150(b)	185	164	31	25	158	12
200	243	218	37	30	211	14
250	305	272	39	31	265	15
300	358	323	39	31	315	15

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Doc : No. MTD 19 (3726)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
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Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002 — 331 01 31, 331 13 75

Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola
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Printed at New India Printing Press, Khurja, India